

Dist  
12/21/04



United States  
CONSUMER PRODUCT SAFETY COMMISSION  
Washington, D.C. 20207

MEMORANDUM

DATE: December 21, 2004

TO : The Commission  
Todd Stevenson, Secretary

Through: John Gibson Mullan, General Counsel *je*  
Patricia Semple, Executive Director *PS*

FROM : Jacqueline Elder, Assistant Executive Director *je*  
Office of Hazard Identification and Reduction

Margaret L. Neily, Project Manager, Mattresses/bedding *ml*  
(301) 504-7530

SUBJECT: Responses to Commissioner Moore's Mattress and Bedding Briefing Package Questions

Following the staff briefing to the Commission on the Briefing Package of regulatory options for mattress and bedclothes flammability, Commissioner Moore requested answers to a number of questions. Each of those questions is reprinted verbatim below, followed by the staff's response.

THE SCOPE OF THE STANDARD:

1. The standard seems to focus primarily on the escape of the occupants of the room of fire origin, although staff does assume that occupants in other areas of the house will also benefit from the increase in escape time. For those outside the room of origin, the key to their survival could be how much of the thirty minutes will go by before a smoke detector outside the room of origin sounds. Were tests performed, on both unimproved and improved mattresses, to determine at what point in the test smoke detectors outside of the room of origin would sound to give other occupants of the house their first warning of danger?

About two-thirds of all mattress fatalities are attributed to mattress fires that lead to flashover. This accounts for nearly all the fatalities that occur outside the room of fire origin. The draft proposed standard requirements are intended to slow the rate of fire growth, reduce fire severity, and effectively delay or minimize the possibility of flashover. For those outside the room of origin, the primary benefit from the standard will be the delay or prevention of flashover, providing a substantial increase in time for discovery of the fire and escape from potentially hazardous conditions.

NOTE: This document has not been  
reviewed or accepted by the Commission.  
Initial *ml* Date *12/21/04*

*12/21/04*  
RECEIVED BY PETITION  
RULE MAKING / CONSUMER PROTECTION

Our estimates of the primary benefits of the standard are based on an analysis of CPSC IDIs. Most of the IDIs identified situations in which there was an awareness of the fire and escape was attempted. Smoke alarms were not considered during the analysis, and estimated benefits are not assumed to be a result of smoke alarm operation. Significantly, about 60% of residential fire deaths occur in homes without smoke alarms.<sup>1</sup>

**2. Certain FR barriers produce a low quantity of smoke during a fire. Could this have an effect on the amount of escape time that would elapse before enough smoke is generated to trigger a smoke alarm (particularly one outside of the room of origin)?**

Staff is not aware of data that compares or identifies the amount of smoke generation from different barriers. Tests of mattresses containing barrier components show a range of fire performance. Mattress burn tests, without the presence of bedclothes, typically produce a small fire as the mattress ticking and/or sacrificial layers burn from being ignited by the burners. In a typical fire scenario, bedclothes would likely be present and would likely become involved in the fire. Even with improved mattress designs, the sacrificial layers, ticking, and bedclothes would still generate smoke that would trigger a nearby smoke alarm, even one outside the room of origin.

**3. The package indicates that the open flame standard is expected to reduce fires caused by smoking materials as well as fires caused by open flames. Have tests been done to determine how improved mattresses meeting the draft open flame test would fare in the cigarette ignition test?**

The Commission staff has conducted cigarette tests on a limited number of mattress designs that meet the new performance criteria. None has ignited. Mattress and barrier producers have also indicated in discussions with the staff that they continue to test to 16 C.F.R. Part 1632 and have not yet identified smoldering ignition problems with the new technologies being considered for meeting the new open flame performance requirements.

**What assumptions about that were made to come to the conclusion that the open-flame test will reduce fires caused by smoking materials? How many of the benefits being attributed to the new proposed standard are already being derived from the cigarette ignition standard?**

The test method used in the draft proposed standard is expected to reduce fire losses caused not only by traditional small open flame sources such as lighters, matches, and candles, but also other small open flame sources, smoking fires, and nearby heat sources. It is noted that, regardless of the initial heat source, investigation data indicates that once a fire ignited, the bedding present also ignited, which would produce a flame similar to that used in the NIST tests and draft proposed standard.

---

<sup>1</sup> Ahrens, Marty, U.S. Experience with Smoke Alarms and Other Fire Alarms, National Fire Protection Association, November 2003.

The cigarette ignition standard is intended to *prevent* cigarette-ignited fires. The incident data show, however, that some of these fires appear to progress beyond smoldering or otherwise become the open flame scenario addressed by the draft proposed standard. The benefits of the draft proposed open flame standard include those that are not achieved by the current cigarette standard, i.e., those fires and fire losses still occurring that are reported in the fire loss estimates.

**4. In a couple of places the briefing package indicates that the new standard would reduce smoking material fires in conjunction with FR 1632. What types of fires would not be covered by the new FR 1633 but would be covered by FR 1632, since your Table 1 on page 76 shows all of the smoking material deaths as potentially addressable by the new standard?**

16 C.F.R. Part 1632 is intended to *prevent* smoldering ignition of mattresses from a cigarette. The draft proposed standard is not designed to prevent smoldering or open flame fires. It is intended to, for a specified period of time, *limit the size of the fire* produced from ignition sources that approximate or are smaller/less intense than the large burners representing burning bedclothes. The draft proposed standard, then, should *limit* all fires that are *not prevented* by the cigarette standard.

**5. It has been suggested that the promulgation of the proposed standard would make the mattress cigarette ignition standard unnecessary. Does staff agree with this suggestion and, if so, would staff at some point recommend that the cigarette ignition requirements be removed?**

The standard that addresses cigarette ignition resistance, the *Standard for the Flammability of Mattresses and Mattress Pads*, codified as 16 C.F.R. Part 1632, remains in effect unless it is modified or revoked by the Commission in a separate rulemaking proceeding. During such a rulemaking, the need for maintaining both an open flame standard and the standard for cigarette ignition resistance would be thoroughly evaluated.

The industry has expressed concerns about the heavy cigarette standard test burden that will be generated as a result of redesigning all of their product lines to meet a new open flame standard. The staff believes it would be reasonable to consider options to minimize this test burden as well as to review the need for continuing or modifying 16 C.F.R. Part 1632.

## **FLAME RETARDANT CHEMICALS**

**1. There are some data gaps and uncertainties in our knowledge of some of the health risks and environmental impacts that may result from the use of certain FR chemicals. What are some of the mechanisms in place, regulatory and others, which can be used to control the possible use of flame retardants that may pose hazards to the environment or human health?**

Several Federal agencies, including CPSC, have authorities that can be used to control the use of flame retardants that could pose hazards to the environment or human health. Under the Federal Hazardous Substances Act (FHSA), if the Commission had evidence that a specific FR chemical

was toxic and could cause substantial injury or illness as used in mattresses, the Commission would have the authority to ban mattresses made with that chemical (or with some threshold amount of the chemical). In some circumstances, the Commission would have the authority to establish safety standards or a ban under the Consumer Product Safety Act if it found that mattresses containing a specific FR chemical posed an unreasonable risk and it could make other requisite findings. CPSC staff can conduct hazard assessments of chemicals that are thought to have the potential for causing adverse health effects. Also, manufacturers have the responsibility to ensure that their products will not harm consumers under the reasonably foreseeable use provision of the FHSA.

The U.S. Environmental Protection Agency (EPA) has broad powers to regulate the use of toxic chemicals under the Toxic Substances Control Act (TSCA).<sup>2</sup> It also monitors and promotes research into potential toxic or environmental effects of chemicals which it believes could pose environmental risks. With regard to flame retardants, the EPA is developing a significant new use rule (SNUR), under Section 5(a)(2) of TSCA, which is expected to cover the use of several flame retardants in residential upholstered furniture. It has recently issued a SNUR that covers any use of the flame retardants pentabromodiphenyl ether (69 Fed. Reg. 70404), which had been used in polyurethane foam, and octabromodiphenyl ether, a similar compound used in other urethane foam materials. A SNUR requires chemical manufacturers and importers to report scientific data to the EPA so that EPA may determine whether controls on the use of the chemical may be warranted.

Under the EPA's New Chemical Program, which is mandated by Section 5 of TSCA, anyone who intends to manufacture or import a new chemical must notify the EPA before doing so. This provides the EPA with an opportunity to review the available information on the chemical and, if necessary, order additional testing or establish controls on the use of the chemical. Other EPA activities involve researching and monitoring the use of existing chemicals, including some FR chemicals. If information is developed during these activities suggesting that a chemical could be toxic or have adverse environmental effects if used in mattresses, the EPA could impose controls on the use of the chemical to ensure human or environmental safety. Other Federal Agencies, such as the Occupational Safety and Health Administration and some agencies within the Department of Health and Human Services, have programs that conduct research on the health effects of different chemicals, including some FR chemicals.

**2. How long would you expect the migration/exposure studies on treated mattress components to take in your assessment of the potential health risks associated with the use of FR chemicals in mattresses? Will this work be done at our lab or will any of it have to be contracted out?**

The industry has several options available for meeting a proposed mattress flammability standard; the use of FR chemicals is only one such option. Based on the staff's qualitative assessment, there are some barrier materials that use FR chemicals that are expected to be of low concern for potential adverse health effects. The staff intends to continue its evaluation by

---

<sup>2</sup> 15 U.S.C. § 2601 et.seq. (1976).

conducting quantitative studies on FR-treated mattress components at its laboratory. This is an effort that is expected to be ongoing as the industry's use of FR chemicals evolves.

**3. Despite some overlap in the FR chemicals that could be used in an upholstered furniture standard and in this proposed standard, will EPA have to issue a separate SNUR for the mattress applications?**

The EPA is expected to propose a significant new use rule (SNUR) that will cover the use of specific FR chemicals in residential upholstered furniture. Some of the FR chemicals that are expected to be covered by the SNUR may also be used in FR barriers for mattress. Additionally, on December 6, 2004, the EPA issued a separate SNUR that covered the use of two polybrominated diphenyl ethers, which were used as fire retardants in polyurethane foam, in any application. At this time, however, the EPA is not expected to issue a SNUR specifically for mattress FRs.

**WORDING OF THE DRAFT STANDARD**

**1. This sentence appears on page 14 of the draft standard: "...The area surrounding the test specimen in an open calorimeter layout shall be sufficiently large that there are no heat re-radiation effects from any nearby materials or objects." Is this specific enough—what means would a lab use to satisfy this requirement as currently drafted?**

In order to conduct fire testing involving open-flame combustion, practices should be taken to minimize the possibility of heat radiating back to the specimen from nearby reflective surfaces. The energy amount released during tests of mattresses designed to meet the draft proposed standard, 16 C.F.R. Part 1633, is sufficiently low so that the re-radiation from nearby reflective objects is expected to be negligible. In addition, it is not expected that any surfaces would be close since the area around the specimen in an open-calorimetry configuration needs to be clear in order to maneuver the burner apparatus and successfully conduct the testing. This statement is a reminder of good laboratory practices.

**2. Was there a reason for using a different definition of "bunk bed" in this standard than is found in our bunk bed regulation?**

The bunk bed standard, 16 C.F.R. Part 1213, is a mechanical safety standard that addresses entrapment hazards from bed structures. It defines a bunk bed in terms of the distance of the foundation from the floor. The draft proposed mattress standard, 16 C.F.R. Part 1633, addresses the flammability of the *mattress* used in a bunk bed, which is described in the glossary as a tier of beds. The precise orientation of the mattress in the bunk bed is irrelevant for this standard. This is the same bunk bed description as that used in the cigarette ignition standard for mattresses, 16 C.F.R. Part 1632.

**3. Is a “dressing table” the same as a “changing table?” Is “dressing table” the term manufacturers uniformly use for this product?**

In the context of the draft proposed standard, 16 C.F.R. Part 1633, “dressing table pad” is the same as “changing table pad” since it is part of the list of juvenile product pads. The term “dressing table pad” was used in order to be consistent with the terms used in 16 C.F.R. Part 1632.

**4. It appears that the label on one-of-a-kind mattresses (page 47 of the draft standard) only needs to be on one side of the mattress. If, as is speculated in Tab G, there will be an aversion to producing double-sided mattresses because it will be harder for them to pass the burn test, should this label be required to be on the top side of a one-sided mattress so consumers would see it? Is the requirement to keep the prescription for the mattress for three years after the date of manufacture a long enough time, given the random nature of fires and the long time mattresses are in use?**

Although the draft proposed standard requires that the label for one-of-a-kind mattresses be attached so it remains on the mattress for its useful life, it does not specify where on the mattress the label should be affixed. Based on experience with the current mattress standard, 16 C.F.R. Part 1632, which has a similar provision, it is assumed that such one-of-a-kind labels will be sewn into one of the edge seams of the mattress, which is common practice in the industry for attaching “law labels” in general. If attached on the edge, the label would still be visible regardless of which side of the mattress faces up.

The requirement to keep the prescription for the mattress for three years after the date of manufacture is consistent with the requirements for one-of-a-kind mattresses given in 16 C.F.R. Part 1632. This requirement is also consistent with the prototype recordkeeping requirement, which calls for manufacturers to keep prototype records for three years after the prototype ceases to be produced. The term of three years was derived from policy considerations as described in the next answer below.

**5. The standard also calls for prototype testing records to be kept for only three years after the production of that mattress ends. How long is a particular mattress typically produced? Again, given the random nature of fires which can happen at any point in the life of a mattress, is three years long enough?**

Based upon experience with the current standard for mattresses, 16 C.F.R. Part 1632, firms produce a prototype for an industry-wide average of 3-5 years; some firms have produced prototypes for as long as 25 years. The requirement to retain records for three years after production of a particular mattress prototype ceases is a result of policy considerations, balancing the cost to manufacturers to retain the records against the benefits to consumers to have such records retained. It is assumed that if a particular mattress has a flammability problem, that problem would become known during the time that the prototype is produced plus the additional three years after the manufacturer stops producing that mattress.

## MISCELLANEOUS

**1. How were the probability spreads for your Post-Standard Casualty Categories (p. 74 of the package) developed? Are these standard spreads for five categories of this nature where the first category is a yes (or 1) and the fifth is a no (or 0)?**

As discussed in the methodology section of Tab H, the Post-Standard Casualty Categories and the probability spreads associated with them were created by CPSC staff to reflect its broad assessment of the risk of death or injury in the scenarios presented. They are not reflective of any other standard categories to our knowledge.

**2. Tab I looks at a larger number of in-depth investigations of mattress and bedding fires than is referenced in Tab H and found that of the cases where the first item ignited was identified, only 52% indicated bedclothes. How do you reconcile that with Tab H's conclusion that 80% of the fires investigated had bedclothes as the first item ignited?**

The EP report cited in Tab I reflected the first-to-ignite item cited by fire department reports. As noted in the recent EP reports (Tabs B and H) the amount of fire damage often precludes the availability of physical evidence that could identify which item ignited first. Although the rationale used by fire departments to choose between mattress and bedding ignition is uncertain, those who chose to cite the mattress may have done so based on their certainty that a mattress was involved (e.g., evidence of metal springs), as opposed to bedding which may have been reduced to ashes.

Based on recent laboratory testing which demonstrated the ignition potential of bedding, staff reevaluated the investigation data focusing first on whether bedding was on the mattress at the time of the fire. When bedding was present, it was assumed that the bedding ignited first in most cases. The staff considered mattresses to be ignited first mostly in fires in which the investigations indicated either no bedding was present or the flame contacted the bed assembly from underneath. Thus, the estimated percentage of bedding ignitions is higher in the more recent report (Tab H) than in the previous report, and we believe it presents a more accurate picture of what occurs in such fires.

**3. The impact of the standard on small business hinges to some extent on their ability to enter into pooling agreements. How much pooling goes on now and, if it is not done to a great extent, what factors could work to inhibit pooling in the future?**

Small firms are expected to enter into pooling agreements under the draft proposed standard (16 C.F.R. Part 1633) because of the relatively high cost of testing. Anecdotal evidence collected by representatives of the International Sleep Products Association indicates that several small- and medium-sized firms that do not share a common market are already entering into pooling arrangements. The extent of pooling arrangements among small businesses is expected to increase over time, as they approach the effective date and become more informed through industry outreach programs.

Industry representatives have indicated that they expect barrier suppliers to develop specific instructions for constructing mattress designs they have tested and to offer these instructions to small producers. This will make it easier for all manufacturers producing that construction to engage in a pooling agreement.

Competition among producers might inhibit pooling by competing producers. Because of high shipping costs, mattresses are produced regionally and therefore competition is limited to producers within the same region.